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Edens et al.

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(54) **APPARATUS AND METHOD FOR REMOVING FASTENERS FROM DOCUMENTS**

(75) Inventors: **Bertus Karel Edens**, Drachten (NL); **Jan Jacobus Peter Remijnse**, Meppel (NL)

(73) Assignee: **Hadewe B.V.**, Drachten (NL)

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(52) **U.S. Cl.** **83/13**; 83/686; 83/689; 30/358; 227/76; 227/63
(58) **Field of Search** 83/686, 597, 689, 83/589, 542; 30/358; 227/76, 63

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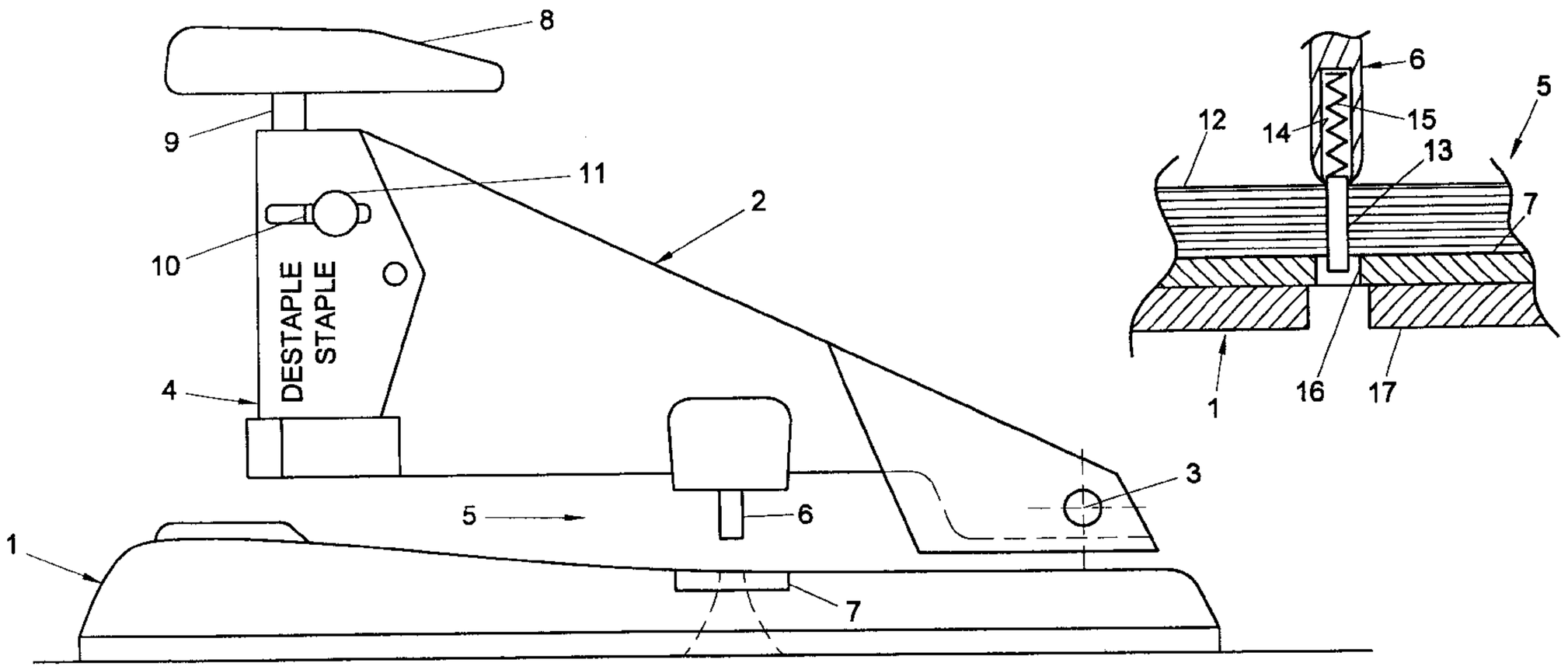
Primary Examiner—M. Rachuba
(74) *Attorney, Agent, or Firm*—Burns, Doane, Swecker & Mathis, LLP

(57) **ABSTRACT**

Apparatus for removing fasteners (**13**; **63**; **113**; **163**) from documents (**12**; **62**; **112**; **162**) with a perforator (**5**; **55**; **105**; **155**; **205**) for perforating documents (**12**; **62**; **112**; **162**) in the area of the fastener to be removed, wherein the means for separating from the set of documents (**12**; **62**; **112**; **162**) the fastener to be removed (**13**; **63**; **113**; **163**) are constructed as a perforator for perforating the set of documents closely along the fastener to be removed. Also disclosed is a method for removing fasteners (**13**; **63**; **113**; **163**), wherein the fastener (**13**; **63**; **113**; **163**) is separated from the documents (**12**; **62**; **112**; **162**) simply and fast in a single operation by perforating the set of documents (**12**; **62**; **112**; **162**) closely along the fastener to be removed (**13**; **63**; **113**; **163**).

20 Claims, 5 Drawing Sheets



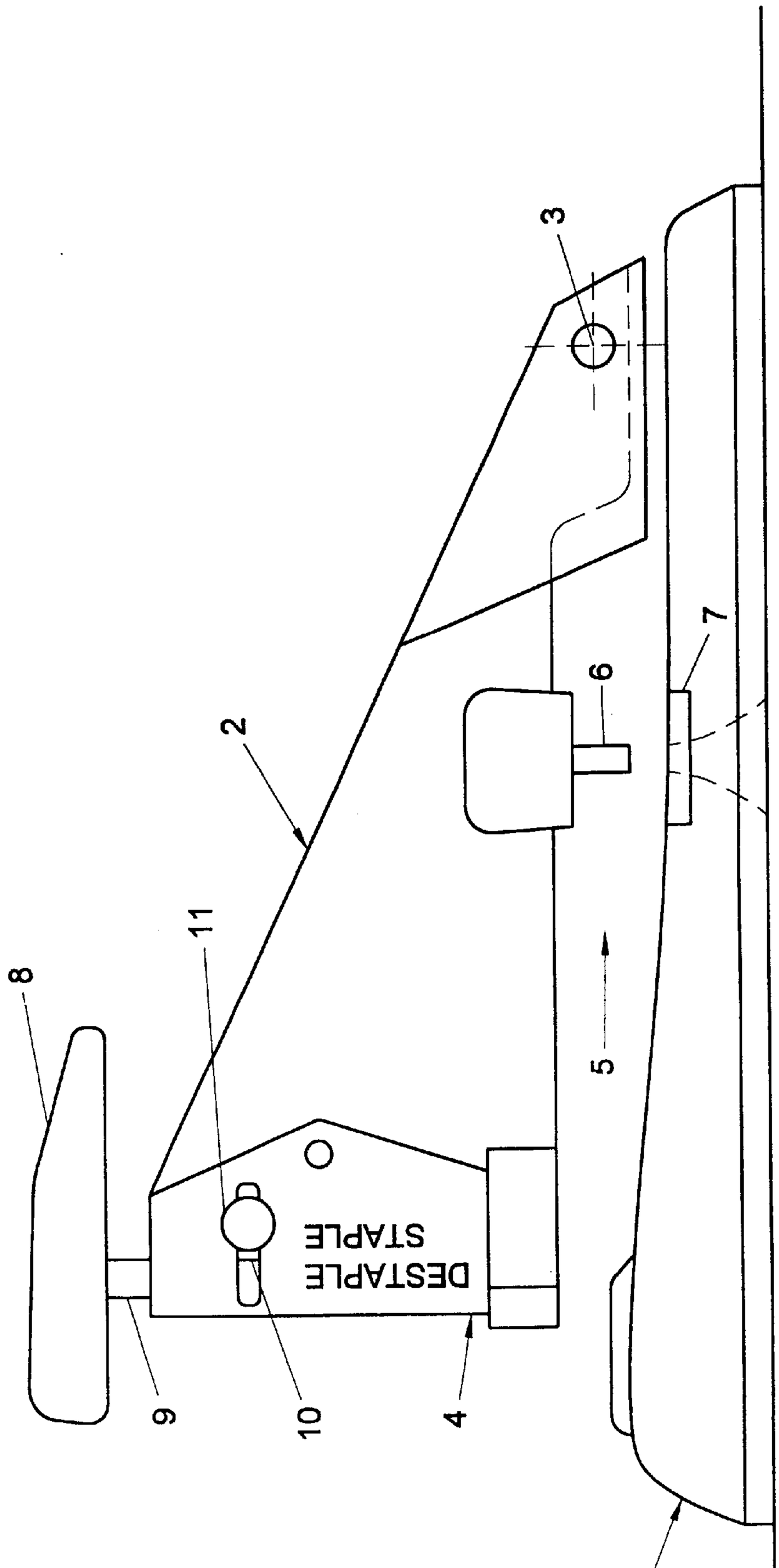


Fig. 1

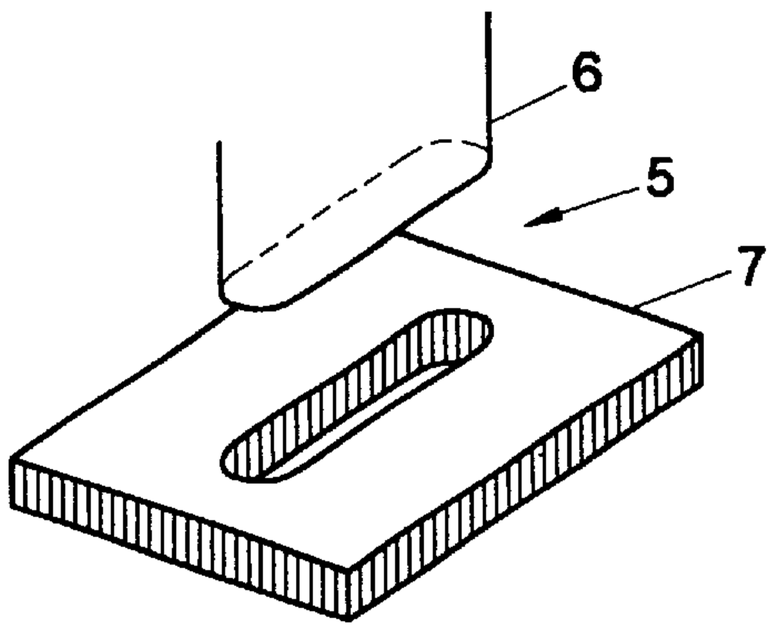


Fig. 2

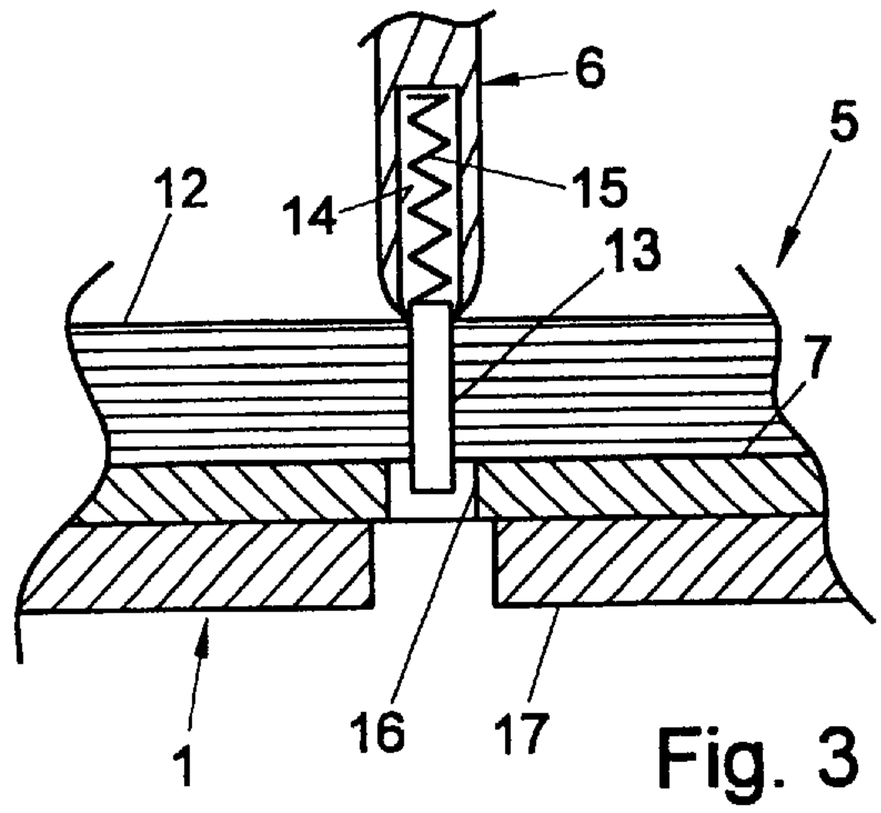


Fig. 3

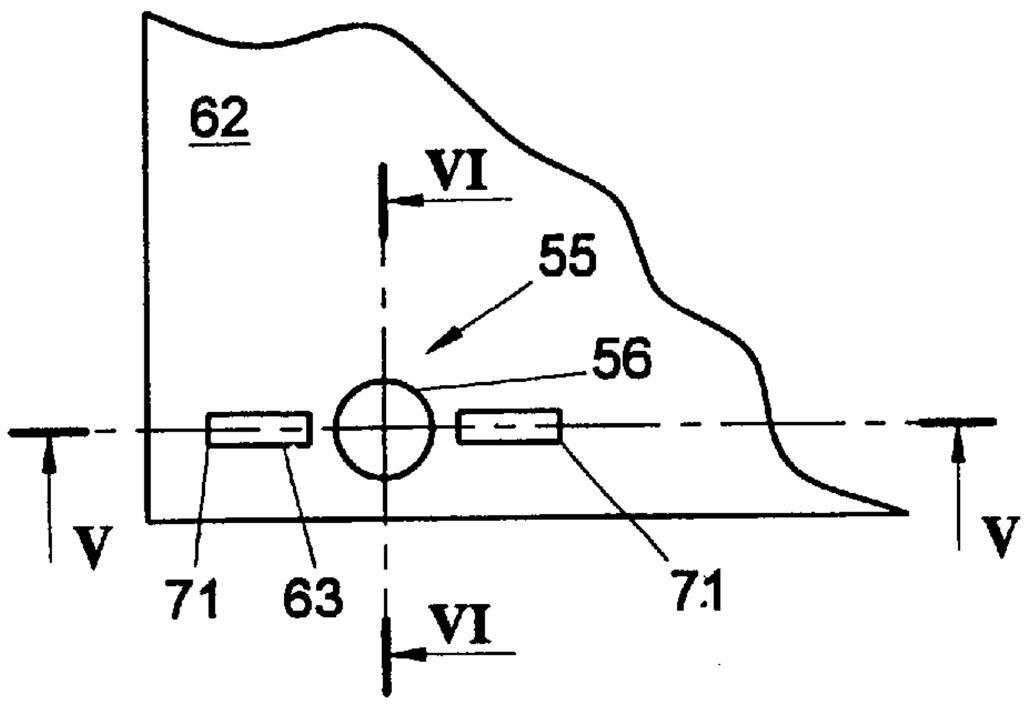


Fig. 4

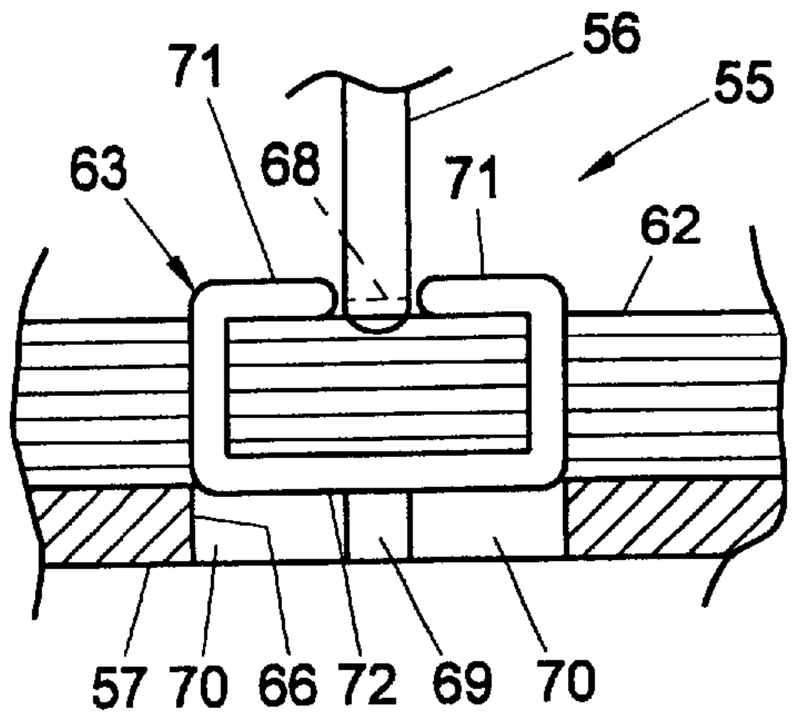


Fig. 5

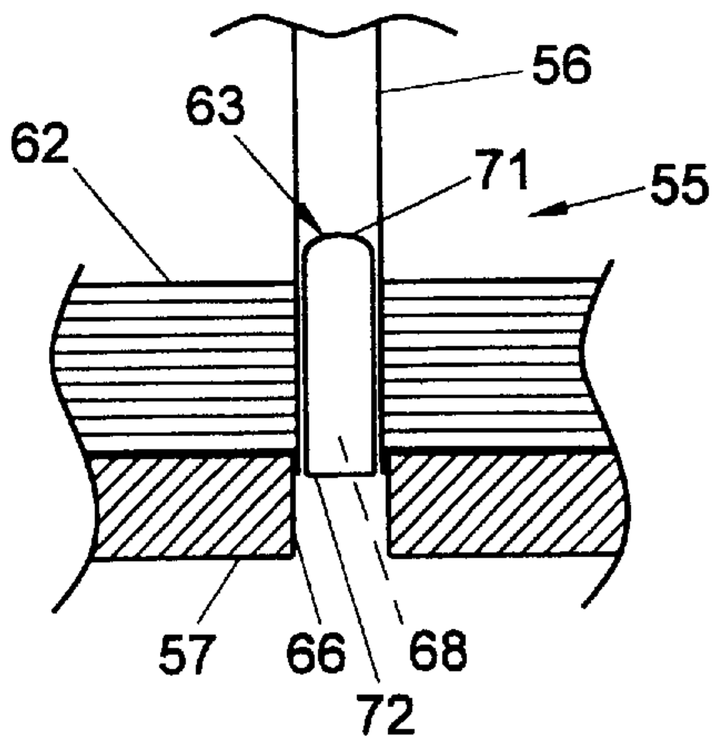


Fig. 6

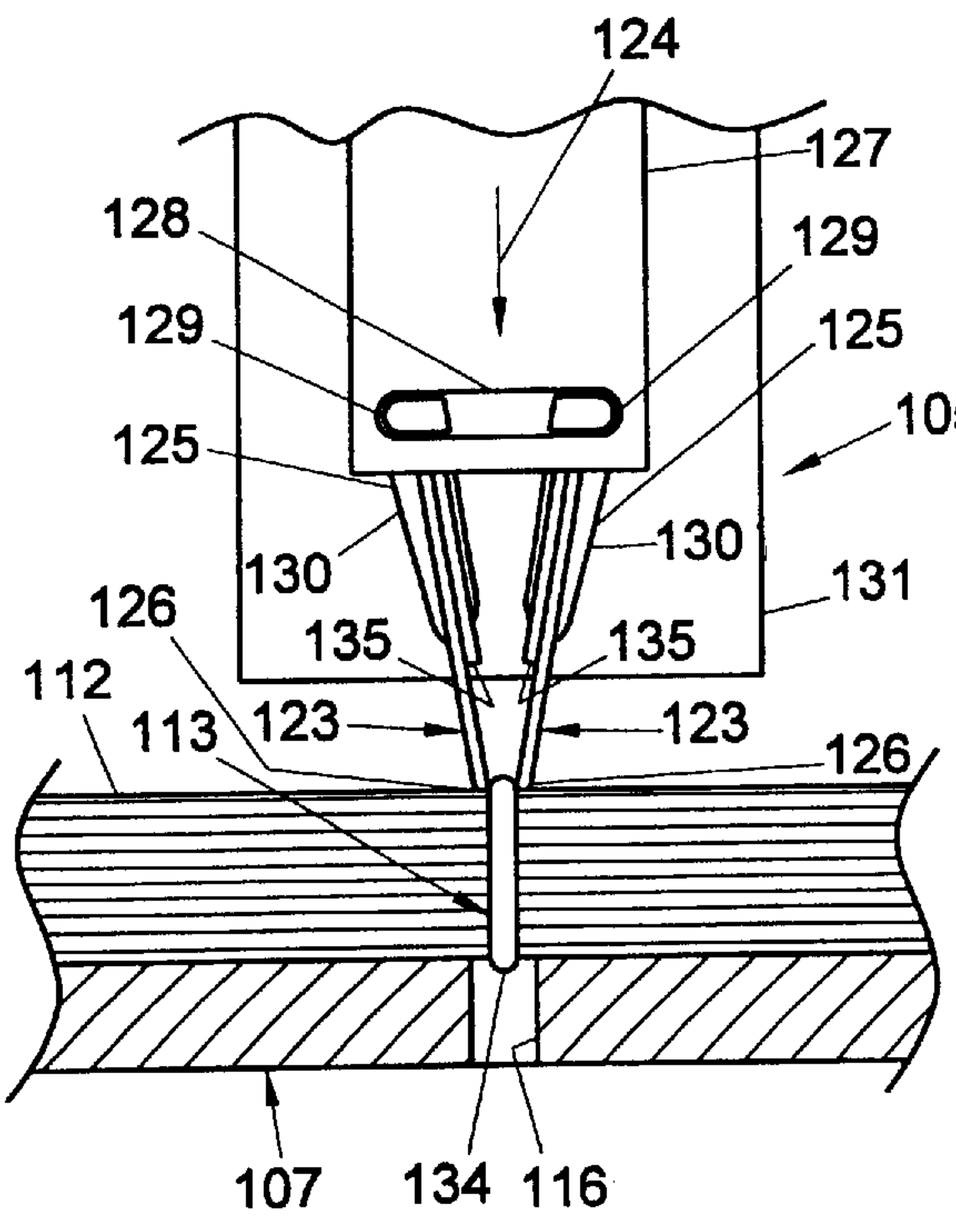


Fig. 7

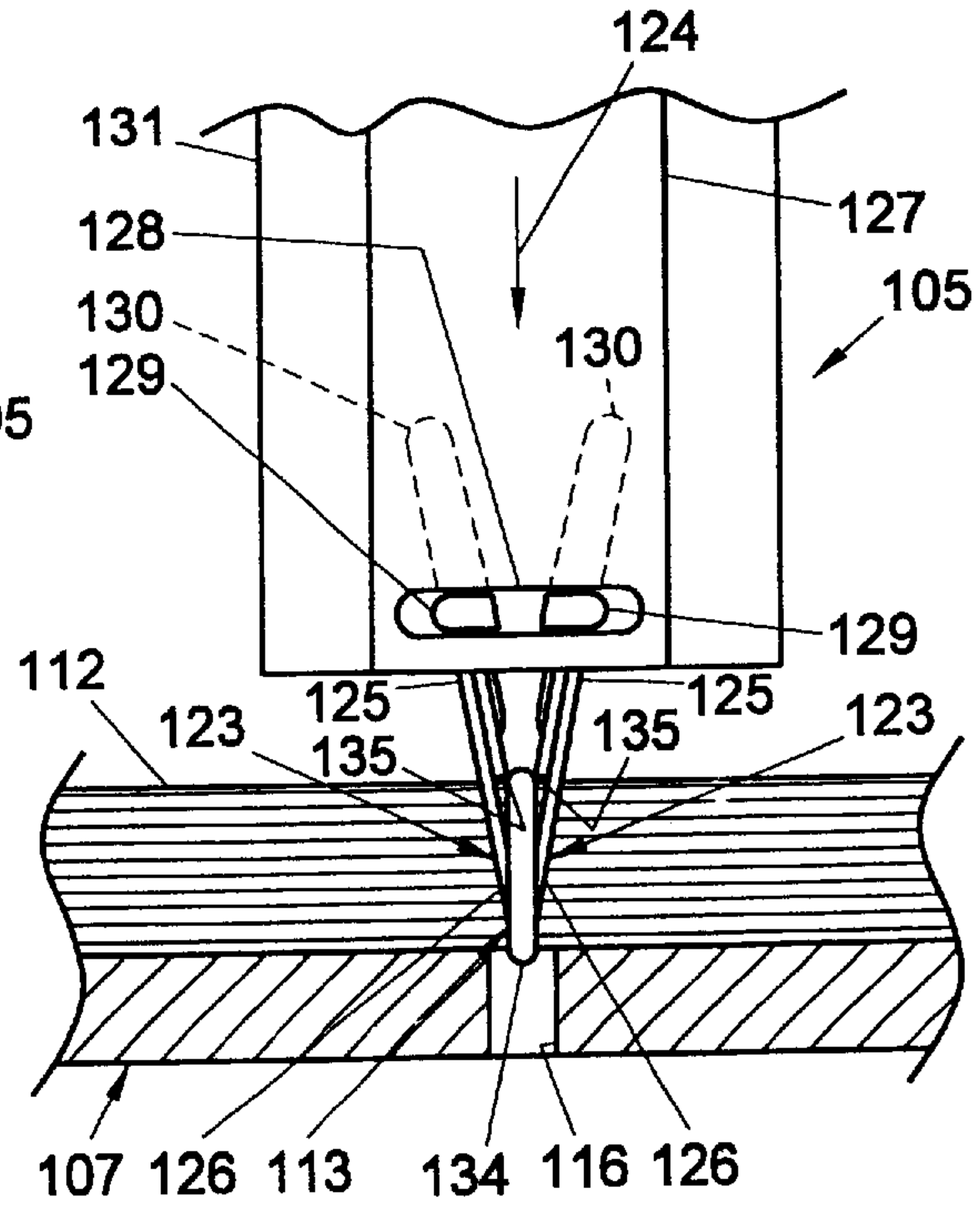


Fig. 8

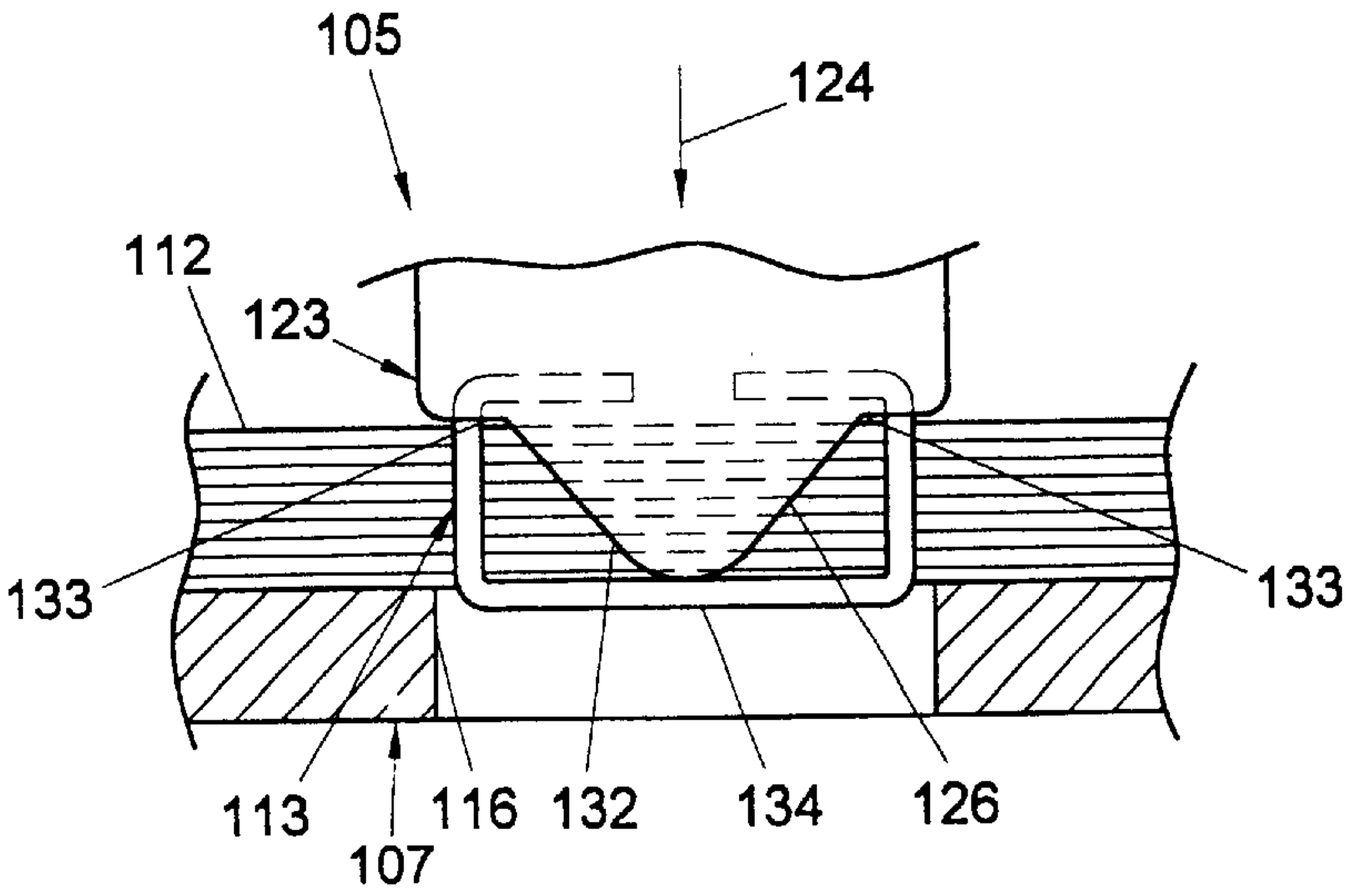


Fig. 9

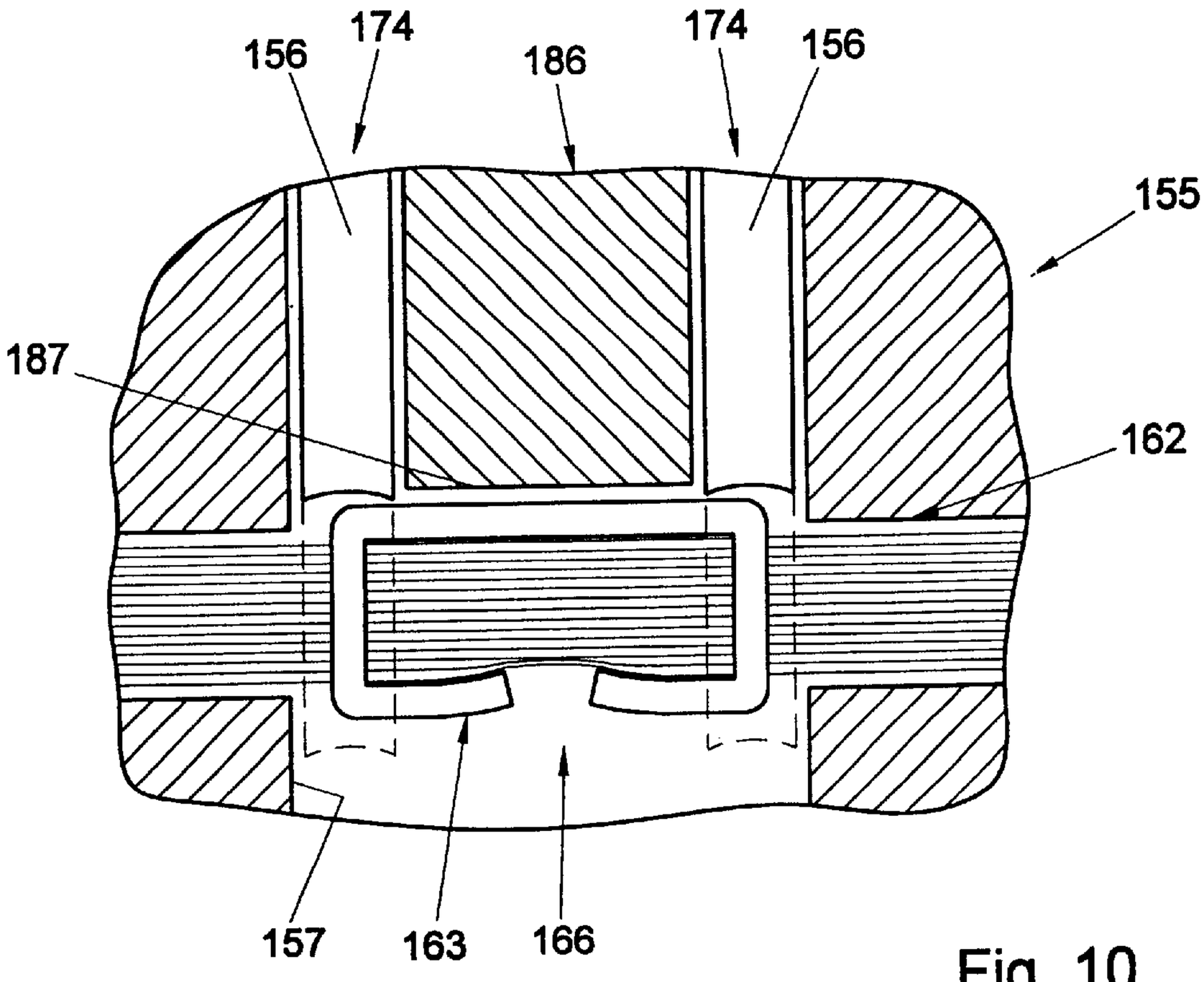


Fig. 10

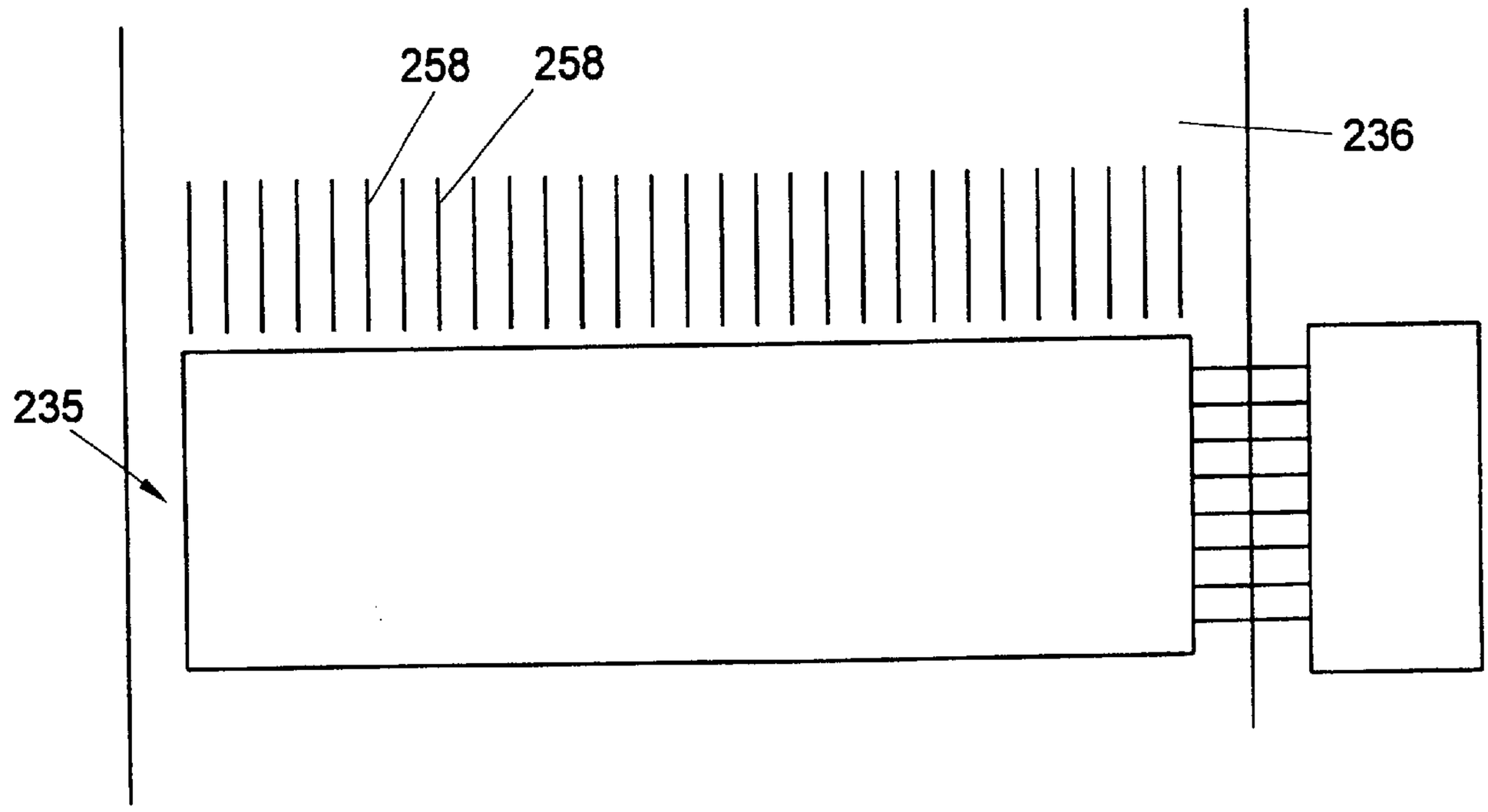


Fig. 11

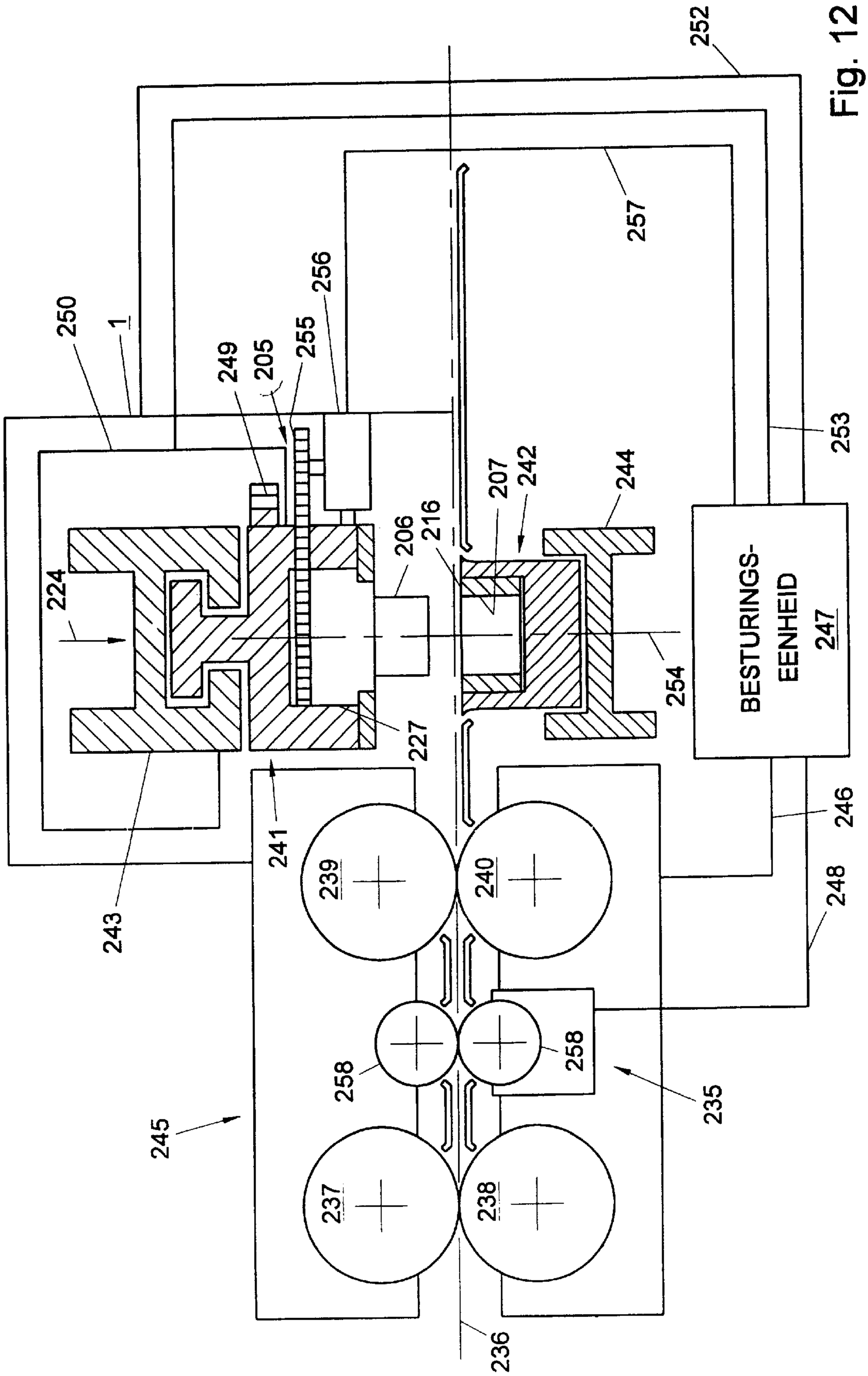

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Fig. 12

APPARATUS AND METHOD FOR REMOVING FASTENERS FROM DOCUMENTS

FIELD AND BACKGROUND OF THE INVENTION

This invention relates to an apparatus and a method for removing fasteners from sets of documents.

Such an apparatus and such a method are known from U.S. Pat. No. 4,090,690.

It is noted that fasteners to be removed occur in a large variety, as in the form of staples with a bridge part and two bent legs, eyelets, metal plates which are bent over a corner of a document, and split pins which, in fitted condition, have a button resting against the set of documents.

The apparatus and method according to U.S. Pat. No. 4,090,690 constitute an improvement over the destaplers known heretofore, especially for rapidly removing large numbers of staples, because the laborious hooking of the fastener and then pulling it away relative to the documents have been replaced by a single operation, whereby at least a portion of the staple is pressed into the set of documents.

However, a drawback of this known destapler is that a staple, after it has been pressed into the set of documents, must still be separated from the documents. A further drawback of this known destapler, and the method to be practiced with it, is that the staples cannot be pressed through sets of documents of a thickness more than twice the wire thickness of the staple. Further, in many cases, the fastener tilts during compression, so that the maximum thickness of a set of documents through which a staple can be pressed is limited to a set of documents having a compressed thickness less than a single time the wire thickness of a fastener.

SUMMARY OF THE INVENTION

The object of the invention to provide a solution to the problem of removing fasteners very fast and reliably from sets of documents.

According to the present invention, this object is realized by providing an apparatus for removing fasteners from sets of documents, which comprises a perforator for perforating a set of documents closely along at least a portion of a fastener to be removed. A further embodiment of the invention for realizing this object is formed by a method for removing fasteners from sets of documents, wherein the set of documents is perforated along at least a portion of the fastener to be removed.

By perforating the set of documents from which the fastener is to be removed, a passage right through the set of documents is created in a simple and reliable manner, so that the fastener can be simply removed. The perforation provided in the set of documents when removing the staple may be of a very minor size and does not constitute any essentially greater damage of the documents than the weakening of the documents and the creases and dog-ears formed in the conventional removal of fasteners. Generally, next to the perforation, sufficient space is left for fastening the documents to each other again, if desired. In general, it is advantageous if the perforation extends as closely as possible alongside the staple. Perforating directly alongside the staple is most ideal, but it is also possible to select distances between the position of this fastener to be removed and the most proximal edge portion of the perforation to be less than 1, 2, 3 mm or slightly more.

Hereinafter, further objects, embodiments, effects and advantages of the invention are described and explained on the basis of a presently most preferred exemplary embodiment and a few variants, with reference to the drawing.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a side elevation of a destapler according to the invention;

FIG. **2** is a cut-off, perspective representation of a punch-die plate combination for use in an apparatus according to FIG. **1**;

FIG. **3** is a sectional side elevation of the punch-die plate combination according to FIG. **2**;

FIG. **4** is a cut-off top plan view of a punch of a destapler according to a further exemplary embodiment in a condition of use above a staple in a set of documents;

FIG. **5** is a sectional side elevation along the line V–V in FIG. **4**;

FIG. **6** is a sectional side elevation along the line VI–VI in FIG. **4**, albeit that the punch is shown in a condition pressed through the set of documents;

FIG. **7** is a sectional cut-off side elevation of a destapler according to a still further exemplary embodiment in a condition of use just before the perforation of a set of documents;

FIG. **8** is an elevation similar to FIG. **7**, in a condition of use in which the set of documents has just been perforated;

FIG. **9** is a sectional cut-off side elevation transverse to the elevation according to FIG. **8**;

FIG. **10** is a sectional cut-off side elevation of a destapler according to a yet further exemplary embodiment in a condition of use just before the perforation of a set of documents;

FIG. **11** is a schematic representation of a sensor for detecting the position and the orientation of a staple; and

FIG. **12** is a cutaway side elevation of a destapler with automatic positioning of the destapling perforator.

DETAILED DESCRIPTION

The following description is based on examples intended for removing staples consisting of wire material forming a bridge part and bent legs, projecting from that bridge part. However, it will be clear to those skilled in the art that adapted embodiments can also be used for removing other types of permanent fasteners provided through documents or embracing them.

FIG. **1** shows, by way of example, a stapler based on a commercially available stapler of the make Rapid, type "2", manufactured by Isaberg AB of Hestra, Sweden, with an underframe **1**, a reciprocable supporting arm **2** which can be pivoted back and forth relative to the underframe **1** about an axis **3**. Naturally, as a basic structure, any other stapler or a specially constructed stapling machine having a sufficiently stable construction can be used.

In a manner which is known and therefore not further described here, the supporting arm **2** is provided with a mechanism **4** for providing staples through sets of documents.

The apparatus further comprises a perforator **5** with a die or punch **6** and a die plate **7**. The supporting arm **2** further carries a punch member **6** of perforator **5** and the underframe **1** carries the die plate member of the perforator **5**.

The mechanism **4** for providing staples has an operating knob **8** which is mounted on a transmission slide **9**. In

conventional use, upon depression of the operating knob **8**, the slide **9** is moved down and a staple is shifted off a row of staples and pressed into a set of documents which is held between the supporting arm **2** and the underframe **1**. To block the transmission slide **9** in its upper position, the mechanism **4** for providing staples comprises a blocking pawl **10** which is operable by a sliding knob **11**. When the sliding knob **11** is in the "STAPLE" position, the transmission slide **9** is released, allowing it to reciprocate in a conventional manner for providing staples. When the sliding knob **11** is in the "DESTAPLE" position, the transmission slide **9** is blocked, allowing the operating knob **8** to be pressed upon for perforating (piercing) paper in the area of a staple without the stapling mechanism **4** dispensing and placing a new staple.

The construction and the operation of the perforator is described in more detail with reference to FIGS. **2** and **3**, which represent the embodiment of perforator **5** that is presently preferred most.

In FIG. **3**, the perforator **5** is represented with a set of documents **12**, fastened to each other by a staple **13**, placed between the punch **6** and the die plate **7**. The punch **6** forms a projection for perforating the set of documents **12** and, as the set of documents is being perforated, for engaging, through the perforation provided, the staple **13** to be removed, which is thereby pressed, ahead of the punch **6**, through the Set of documents **12**.

More particularly, starting from the situation shown in FIG. **3**, first the punch **6** is moved down, causing the set of documents **12** to be perforated and portions of the documents in which the staple **13** is provided to be cut loose from surrounding material. In the process, the staple **13** and any adjacent material of the set of documents **12** are temporarily received in a recess **14** in the punch **6**, while a schematically indicated resilient element **15** engages the staple and thereby exerts a pressure force on the staple **13** in the direction of movement of the punch **6**. As soon as the perforation of the set of documents **12** is complete and the staple **13** has been cut loose completely from the documents **12**, the staple **13** is ejected by the resilient element **15** through an opening **16** in the die plate **7** and a portion **17** of the subjacent underframe **1**.

It is also possible to make the recess **14** in the punch **6** considerably less deep, for instance just deep enough to keep the staple **13** in front of the punch **6**. In that case, during the perforation of the set of documents **12**, the staple is pressed ahead of the punch **6**, which requires a higher punching force but enables a simple construction of the punch and limits the risk of the staple getting stuck in the recess in the punch.

The die plate **7** has an elongate opening for receiving and passing a staple to be removed. This provides the advantage that the staple can be punched loose and separated in a single movement. It is also possible, however, to have a punch run against a counterplate and, for instance, to eject the staple by moving the punch together with the set of documents away from the counterplate.

The opening **16** in the die plate **7**, located opposite the punch **6**, further facilitates accurate positioning of the staple **13**, in that the opening **16** in the die plate **7** further functions as a positioning recess into which falls the staple portion remote from the punch, projecting from the set of documents **12**. When positioning the set of documents **12**, it is thus clearly felt whether or not the staple **13** is properly positioned. Furthermore, arresting the staple in the opening **16** facilitates keeping the staple **13** exactly in its position opposite the punch **6** during punching.

For an accurate positioning of the staple **13**, it is further advantageous that the opening **16** in the die plate **7** is shaped to correspond with the cross section of the punch **6**. If the portion of the staple **13** remote from the punch **6**, projecting outside the documents **12**, falls into the opening **16**, the staple is thus reliably positioned in the punching path of the punch **6** at all times.

FIGS. **4–6** represent an alternative embodiment of a perforator **55** for a destapler according to the invention, each time in combination with a set of documents **62** and a staple **63** to be removed therefrom. The perforator **55** has a punch **56** and a die plate **57** with an opening **66**. The punch **56** has an end face **68** which forms a profile in the form of a channel-shaped recess, traversing the end face, for receiving a portion of a staple **63**. A central portion **69** of the opening **66** of the die plate **57** corresponds to the shape of the cross section of the punch **56**. Peripheral portions **70** of the opening **66** of the die plate **57** on opposite sides of the central portion **69** are open when the punch **66** is in a position projecting into the die plate **57**. Other profiles, such as a serration or a pair of projecting parts, may also be used to keep the staple opposite the end face during removal.

In the use of such a perforator **55**, the perforation is provided by the punch **56** between arms **71** of the staple **63**. Each time the punch **56** has been pressed through the set of documents **62**, the punch **56** engages a bridge portion **72** of the staple **63**. This stage of the process of removing a staple is shown in FIG. **6**. Finally, the punch **56** presses the staple **63** out of the set of documents **62**, causing the arms **71** to bend slightly to a position transverse to the plane in which the set of documents **62** extends. The channel-shaped recess extending transversely across the end face of the punch **56** here ensures that the bridge portion **72** of the staple **63**, as it is being pressed away, remains opposite the punch **56** and does not slide laterally off the end face of the punch **56**. A particular advantage of this perforator is that it does not need to be oriented relative to the staple to be removed, at least when the opening in the die plate allows the passage of staples regardless of the orientation in the plane of the set of documents.

Since the central portion **69** of the opening **66** in the die plate **67** is wider than the peripheral portions **70** of that opening **66**, a punch **56** can be used which is wider than the staple **63**, while the staple **63**, owing to the narrow peripheral portion **70**, is accurately centered, especially in its transverse direction, relative to the punch **56**, and the punch **56** reliably engages centrally of the staple **63**. Further, the narrow design of the outer portions **70** of the opening **66** limits bulging of the documents.

FIGS. **7–9** represent another alternative embodiment of the perforator **105**. This perforator **105** is provided with knives **123** for cutting through a set of documents **112** along a staple **113** to be removed. By cutting along a staple **113** to be removed, and removing the cut-loose staple **113** from the set of documents **112**, the amount of material that is removed from the documents **112** is kept very low. If cutting is limited to a single cut along the staple, the amount of cut-loose material can even be limited to substantially zero.

According to the present example, however, two knives **123** are used, which are suspended to cut on opposite sides along a staple **113** to be removed. Thus, the staple **113** can be cut loose highly reliably.

The knives **123** are suspended so as to converge in a cutting direction (arrow **124**), causing them, during cutting, to push towards the staple **113** and slide along the staple **113**. As a result, cutting proceeds very closely along the staple

113 and cuts are obtained which, practically speaking, communicate with the holes provided in the set of documents **112** when the staple **113** was applied, so that the staple **113** is cut loose completely, or substantially completely, from the set of documents **112**.

The knives **123** have fixed ends **125** which are suspended so as to be movable relative to each other, transversely to the cutting direction **124** and the cutting edges **126**. To that end, a knife holder member **127** which is reciprocable along with the knives **123** in the cutting direction **124**, is provided with a slot **128**, transverse to the cutting direction, in which slot guide slides **129** carrying the fixed ends **125** of the knives **123** can be reciprocated. Due to the displaceability of the fixed ends, the angle between the knives **123** can be gradually reduced during the movement in the cutting direction **124**, so that, even when perforating thicker packs of documents **112**, the distance between the cuts on the side of the packs of documents **112** proximal to the knives **123** is limited, and tearing of the documents between the cuts is prevented.

The guide slides **129** are further guided in slots **130** in a fixed portion **131** of the knife holder. These slots **130** converge in the shape of a V in the cutting direction **124**, so that during the performance of a perforation stroke, an imposed movement of the fixed ends **125** of the knives is obtained, with the mutual distance between them decreasing according as the knives **123** move further in the cutting direction **124**. As a result, the knives **123** always move substantially in the direction in which they project, so that tearing of documents is prevented.

For limiting damage to the set of documents **112**, it is further advantageous that the knives **123** are of flexible design, so that they can adjust to the documents **112**. This further provides the advantage that the knives **123**, from the fixed ends **125**, can be pressed obliquely against a side of a staple **113**, but alongside the staple **113** can extend virtually parallel to the legs of the staple. This enables reliably making cuts that extend very closely along the staple throughout their height.

As appears from FIG. **9**, the cutting edges **126** each have a central portion **132** and outer portions **133**, the central portion **132** projecting relative to the outer portions **133** in the cutting direction **124**. Such a design of the cutting edge **126** limits the cutting forces. In combination with the position of the knives **123** projecting obliquely towards the staple **113**, this design of the cutting edge **126** further makes it possible for the central portion **132** of the cutting edge **126** to cut inside the space enclosed by the staple **113**, while the outer portions **133** of the cutting edge **126** are guided by the legs of the staple **113**, extending through the documents **112**.

Optionally, it is possible to further use the central portion **132** of the cutting edge **126**, while engaging the bridge portion **124** of the staple **113**, to press the staple from the documents **112**. However, for displacing the staple **113**, it is preferred to use stop surfaces **135** facing in the cutting direction **124** for carrying along a staple **113** to be removed. This prevents contact between the cutting edge **126** and the typically steel staple **113**, so that the cutting edge **126** remains sharp longer.

According to the example shown, the stop surfaces **135** of the knives **123** engage the portions of the staple **113** that are proximal to the knives **123** prior to cutting. It is also possible, however, to arrange for such stop surfaces carried by the knives to engage another portion of the staple, such as the bridge portion.

In the perforator **105** according to this example, too, the documents **112** are supported in the area of the staple **113** by a die plate **107** with an opening **116**, through which opening **116** the staple **113** passes after being separated from the documents **112**.

FIG. **10** shows a still further exemplary embodiment of the perforator **155** for perforating a set of documents to remove a staple therefrom. The perforator **155** has two punches **156** of a cross section slightly greater than the cross section of the wire material of which the staples to be removed consist. Located opposite the punch dies **156** is a die plate **157** with an opening **166**, in which the dies **156** fit with a very minor lateral clearance, and through which fit portions of the staple **163**. The punch dies **156** are represented in solid lines in a position immediately prior to the cutting of the staple and the perforation of the set of documents **162**. Broken lines indicate the punch dies **156** in an extreme projecting position. To remove a staple **163**, the punch dies **156** are displaced from the starting position in the cutting direction towards the extreme projecting position. This causes the staple to be cut first adjacent two corner points between portions extending through the set of documents and portions extending along the set of documents. Then, two cut-loose portions of the staple **163**, including the portions extending through the set of documents, are pressed away, ahead of the punch dies **156**, out of the set of documents **162**, while the punch dies **156** perforate the set of documents **162**. These cut-loose portions leave the set of documents **162** through-the opening **166** in the die plate **157**.

Since the punch dies **156** have a slightly greater diameter than the wire of the staple **163**, the portions of the staple **163** extending through the set of documents **162** are reliably cut loose and propelled.

To accurately position the punch dies **156** relative to the staple to be cut, on the side of the documents **162** where the punch dies **156** are located in the initial position, a template **186** with a recess **187** is pressed against the set **162**. The staple then falls into the recess **187**, so that the position of the staple **163** with respect to the punch dies **156** is defined. The end faces of the punch dies **156** are provided with a profile ensuring that the out-off portions of the staple are held in front of those end faces during the press-away operation. That profile may be designed, for instance, as a concave surface.

The residual portion of the staple **163** on the side of the template **186** can be removed in various ways, for instance by a blower or a stiff brush.

FIGS. **11** and **12** show an apparatus according to an embodiment of the invention which is presently preferred most as to its general construction. This apparatus comprises a sensor **235** for detecting the position of a staple to be removed, and transport means for displacing a set of documents and the perforator **205** relative to each other, such that the perforator **205** is aligned with the detected position of the staple in the set of documents for providing the perforation in the area of the priorly detected position of the staple.

The transport means formed by a transport path **236**, along which are arranged driven and mutually coupled rollers **260** and carriages **241**, **242** which are mobile along rails **243**, **244**, transversely to the transport path **236**.

Prior to the removal of a staple, the set of documents is scanned for detecting the position of the staple to be removed. Then the documents are displaced along transport path **236** and the perforator **205** is displaced transversely to the transport path until they are displaced relative to each other, such that the perforator is disposed opposite the staple to be removed. The documents can now be reliably perforated in the area of the staple for removing the staple.

The drive unit **245** for driving the transport rollers **237**, **238**, **239**, **240** is connected to a control unit **247** via a line **246**. Further, the sensor **235** is connected to the control unit **247** via a line **248**.

The position of the staple is determined on the basis of the displacement of the documents along the transport path **236** prior to the detection of the staple and on the basis of the position in the direction transverse to the transport path, where the staple is detected. Then the document is displaced over a fixed distance along the transport path **236** and the carriages **241**, **242** are displaced along the rails **243**, **244** into a position corresponding to the position of the staple in transverse direction relative to the transport path **236**.

The upper carriage **241** is coupled to a toothed belt **249** which passes over gears in end parts **250** on opposite sides of the rail **243**. The lower carriage **242** is clamped with some friction in the rail **244**. For displacing the carriages **241**, **242** equally, first the punch **206** of the perforator **205** is set in a position in which it projects into the opening **216** in the die plate **207**. To that end, the entire rail **249**, including the end parts **250**, is moved down relative to the frame **251** of the apparatus. The drive for this can be designed in a manner known per se, for instance with electromagnets which may or may not be enhanced by levers or the like, and is therefore not further described. With the punch **206** in this position, the carriage **241** is displaced and the carriage **242** is carried along.

For operating the perforator **205**, the control unit **247** is coupled via a line **252** to the drive (not shown) of the perforator, which drive is mounted on the frame **251**. To control the position of the carriages **241**, **242** in transverse direction, the control unit **247** is coupled via a line **253** to the drive (not shown) of the toothed belt **249**.

To avoid friction during the displacement of the carriage **242**, it may optionally be provided with friction members engaging the rail **244**, which can be set out of operation.

It is possible that the position of the staple is such that the set of documents is already disposed between the punch **206** and the die plate **207** before the staple has reached the sensor **235** and the perforator **205** can be set in the proper position in transverse direction. For such situations, it may be provided that the documents are first transported back automatically to clear the area of the perforator **205** and then, after the perforator **205** is set in the desired position in transverse direction, to transport the documents along the transport path **236**, such that the staple is brought opposite the perforator **205**. Renewed detection of the staple as it passes the sensor **235** again may then be utilized for the accurate control of the transport of the documents. If the documents are introduced with the staple in a leading portion, return transport of the documents will generally not be necessary.

The perforator **205** is additionally suspended for pivotal motion about an axis **254** in the cutting direction **224**. During the scanning of the set of documents, further the orientation of the staple to be removed is detected and subsequently the perforator **205** is moved relative to the set of documents into an orientation corresponding to the orientation of the staple. To that end, the punch **206** and the die plate **207** are suspended for pivotal motion about said axis **254**, and the punch is mounted in a rotatably suspended carrier **227** which is coupled by a toothed belt **255** to a gear on an output shaft of a stepping motor **256**. The stepping motor is connected to the control unit **247** via a line **257**.

The sensor **235** for detecting the position of the staple is designed as a conductivity sensor. By scanning at which points a set of documents transmits a voltage, it can be determined in a simple manner where the typically metal staple is located.

The depicted sensor **235** comprises a number of detectors **258** in the form of scanning wheels, distributed in a direction transverse to the direction of transport of the documents. The scanning wheels **258** are represented schematically in FIG. **11**, and for clarity only two of them are designated by reference numerals. The voltage is applied to the upper scanning wheels **256**. Failure of the voltage on lower scanning wheels marks the arrival of a leading edge of a set of documents at the location of the sensor **235**. Thereupon, voltage on one or a few of the lower wheels **258** indicates that a staple is located between those wheels. By monitoring which of the lower wheels **258** are subject to a voltage, and registering the position of the documents in the direction of the transport path, the position and the orientation of the staple or staples can be accurately determined.

Then, as regards the position of the staple in the direction of transport, it is sufficient to transport the documents over a fixed distance to the perforator **205** to bring the staple exactly to the location of the perforator **205**.

Within the framework of the proposed concept, naturally many variations are conceivable. Thus, the perforator may, for instance, be mounted in a fixed position with respect to a conveyor, while the documents are displaceable over the conveyor in the x- and y-directions. Such conveyors are described in U.S. Pat. Nos. 5,222,585 and 5,415,266.

For determining the position of the staple, too, various alternative sensors are possible, based on principles for metal detection, known per se, such as a combination of a magnetizer for magnetizing the staple and a sensor sensitive to magnetism, or a combination of an antenna for generating an electromagnetic field and facilities for detecting energy locally absorbed from the field generated. Also various mechanical sensors can be used, such as a ridge for engagement of a staple butting against that ridge, or a thickness sensor. Further, the detection can be carried out in an optical manner, as by the detection of a dispersion characteristic of a metal staple and/or reflection of light of one or more wavelengths, while the light source may be a laser unit producing a line-shaped or planar light beam which is moved along the documents. Such scanners are known per se. Another example of a suitable sensor for determining the position of the staple is a pressure-sensitive film which is pressed against the set of documents by a flat support. Such a film is commercially offered by, for instance, Tekscan, South Boston, Mass., United States.

We claim:

1. A method for removing a fastener from a set of stacked documents mutually fastened to each other by the fastener, comprising perforating said set of documents closely along at least a portion of the fastener to be removed.

2. A method according to claim **1**, wherein the perforation is carried out with a die plate and wherein the fastener is removed via an opening in the die plate.

3. A method according to claim **1**, wherein the perforation is provided by a punch between arms of the fastener and wherein, after the punch is pressed through the set of documents, the punch engages a portion of the fastener on the side of the set of documents remote from the punch.

4. A method according to claim **1**, wherein along the fastener to be removed, at least one line-shaped incision is provided and the cut-loose fastener is removed from the set of documents.

5. A method according to claim **4**, wherein the incision is formed by a knife which further engages the fastener to be removed and carried it along.

6. A method according to claim 1, further comprising, prior to removing the fastener, scanning the set of documents for detecting the position of the fastener to be removed and subsequently displacing the set of documents and the perforator relative to each other until the perforator is disposed opposite the fastener to be removed.

7. A method according to claim 6, wherein during the scanning of the set of documents, further the orientation of the fastener to be removed is detected and subsequently the perforator is moved relative to the set of documents into an orientation corresponding to the orientation of the fastener.

8. A method for removing a fastener from a set of documents fastened together in a stack by the fastener, comprising:

positioning the set of documents fastened together by the fastener between a punch and a die plate;

moving the punch toward the set of documents to perforate documents in the set in an area at least partially surrounding the fastener to cut loose portions of the documents in which the fastener is provided and separate the fastener from remaining portions of the documents.

9. The method according to claim 8, wherein the punch includes a recess which receives the fastener during perforation of the documents.

10. The method according to claim 8, wherein the die plate includes an elongate opening which receives the fastener which has been separated.

11. The method according to claim 8, wherein the set of documents fastened together by the fastener is positioned between a pair of punches and the die plate, with the pair of punches being moved towards the die plate.

12. The method according to claim 8, wherein the die plate includes a positioning recess, the set of documents being positioned between the punch and the die plate such that the fastener is positioned in the positioning recess.

13. The method according to claim 12, wherein the positioning recess is an elongate opening in the die plate.

14. The method according to claim 7, wherein the punch has an end face configured as a channel-shaped recess which receives a portion of the fastener during movement of the punch.

15. A method for removing a fastener from a set of documents fastened together in a stack by the fastener, comprising:

operating a perforating element engaging the set of documents in an area at least partially surrounding the fastener to perforate the documents in the area at least partially surrounding the fastener to separate a portion of each document in which the fastener is provided from a remaining portion of each document.

16. The method according to claim 15, wherein the perforating element is a punch that is moved towards a die plate, the punch including a recess which receives the fastener during perforation of the documents.

17. The method according to claim 16, wherein the die plate includes an elongate opening which receives the fastener which has been separated.

18. The method according to claim 16, wherein the die plate includes a positioning recess, the set of documents being positioned between the punch and the die plate such that the fastener is positioned in the positioning recess.

19. The method according to claim 15, wherein the perforating element comprises at least one knife which are moved towards a die plate.

20. The method according to claim 15, wherein the perforating element includes a pair of punches which are moved towards a die plate.

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